Space Weather Forecast

Issued on Thursday, 12 January 2023 at 00:44 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate solar activity likely. Chance of X-class flares (R3; Strong radio blackouts) throughout. A possible glancing blow from a CME later on the 12th January.

Solar Activity: Solar activity has been Moderate over the past 24 hours, with several M class flares, the largest producing an R2 radio blackout at 11/0149 UTC. There are five numbered sunspot regions on the Earth facing disc and two unnumbered. Three of these regions are magnetically complex and carry a significant flare risk.
No Earth-directed CMEs have been observed in available imagery in the period.

Solar Wind / Geomagnetic Activity: Solar winds started the period at slow-ambient levels but have drifted erratically above the slightly-elevated level, average around 410 km/s. Total Interplanetary Magnetic Field was predominantly weak, while the important north-south alternated between short periods of negative (southward) and positive (northward) but was also weak. Geomagnetic activity was Quiet (Kp 1-2).
Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate, with a chance of becoming High from any Strong flares through the forecast period.
Solar Wind / Geomagnetic Activity: A Moderate flare from the sunspot region in the southwest generated a CME early on the 9th, which may give a glancing blow at Earth later on day 2 (12 Jan), although this carries a low probability. No other Earth-directed CMEs feature in the forecast.
Solar wind speeds are at slightly-elevated levels, perhaps as a result of weak connection with CH62/-. Geomagnetic activity is expected to be Quiet to Unsettled. During day 1 (12th Jan) there is the low chance of a glancing blow from the aforementioned 9th Jan CME, which may increase geomagnetic activity to Unsettled to Active with a slight chance of a G1 minor geomagnetic storm, potentially lasting into day 2 (13th Jan), however this is low confidence. Otherwise, geomagnetic activity should remain at generally Quiet levels.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a risk of an increase should any significant flares occur, giving a slight chance of exceeding the S1/Minor Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	80	80
Very Active	R3 to R5 X	No	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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